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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,651	12/04/2001	Charles Lange	P01,0379	9650

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EXAMINER

TURNER, SAMUEL A

ART UNIT	PAPER NUMBER
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2877

DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/004,651

Applicant(s)

LANGE ET AL.

Examiner

Samuel A. Turner

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the **invention** to which the claims are directed.

### Rejections Under 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 16-19, and 22 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Bowers et al(4,572,949).

Bowers et al teach a fiber sensor for detecting very small displacements with an in-line Sagnac interferometer comprising a short coherence laser diode(10); first coupler(22); a first fiber path(14) including a phase modulator(60), and a delay coil(62); second path(20); second coupler(24); probe fiber(20D); detector(28); and lock-in amplifier(64). The phase modulator(60) is driven at a frequency  $\omega_m$ .

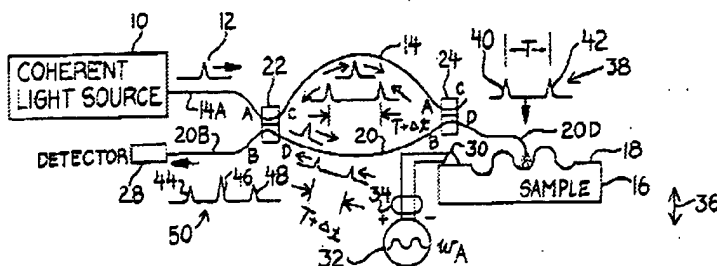


FIG. 1

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### **Rejections Under 35 U.S.C. § 103**

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. § 103(c) and potential 35 U.S.C. § 102(f) or (g) prior art under 35 U.S.C. § 103(a).

Claims 20, 21, and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bowers et al(4,572,949).

Bowers et al measures displacements due to surface acoustic waves propagating in a surface under test and is silent on testing optical transducers, fibers under test, or the use of connectors or telescope optics.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the in-line Sagnac interferometer taught by Bowers to test any object or path in which a path length change is to be measured.

Strandjord teaches a Sagnac interferometer comprising a broadband source(11), first coupler(12), second coupler(26), phase modulator(30), sensing coil(10), and detector(13). The phase modulator is driven at the “proper” frequency which is dependent on the length of the sensor. A feedback loop(35,37,38) is provided to maintain the proper frequency while the output is detected by demodulating the output signal at the proper frequency. The proper frequency is needed to provide a  $\pm \pi/2$  phase shift to the two beams(27,28).

Figure 4 is a block diagram of a FOG multi-function chip system. The system includes a light source (11) connected to a source coupler (12). The source coupler (12) is connected to a FOG multi-function chip (25). The FOG multi-function chip (25) includes a phase modulator (26) and a FOG sensing coil (27, 28). The light source (11) emits light through the source coupler (12) to the FOG multi-function chip (25). The FOG multi-function chip (25) outputs a signal (31) to a photo-detector (13). The photo-detector (13) outputs a signal (14) to a quad PSD (35). The quad PSD (35) outputs a signal (36) to a rate PSD (36), which produces a rate output. The quad PSD (35) also outputs (37) to an integrator (37), which outputs (38) to a VCO (38). The VCO (38) outputs (39) to a wave generator (40), which produces a clock input (41) to the quad PSD and a duty cycle square wave (42) to the FOG sensing coil. The wave generator (40) also outputs (43) to a divider (44), which outputs (45) to the rate PSD. The FOG sensing coil (27, 28) outputs (46) to the rate PSD. The rate PSD (36) also outputs (47) to the wave generator.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Bowers by insuring that the

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modulating frequency  $\omega_m$  is equal to the proper frequency of the sensor. Clearly to maintain the  $\pi/2$  fixed phase shift between the two wavetrains of Bowers frequency  $\omega_m$  must be the proper frequency.

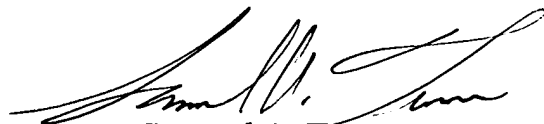
### Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Turner whose telephone number is **(703) 308-4803**. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font, can be reached on (703) 308-4881.

The fax phone number for this Group is (703) 308-7722. The faxing of papers related to this application must conform with the notice published in the Official Gazette, 1096 O.G. 30 (15 November 1989). The Group receptionist telephone number is (703) 308-0956.

Any inquiry of a technical nature regarding reissues, petitions, and terminal disclaimers should be directed to Hien Phan whose telephone number is (703) 308-7502, or Ed Westin whose telephone number is (703) 308-4823.

Any other inquiry of a technical nature, and all inquiries of a general nature including those relating to the status of this application or any patent term adjustment should be directed to TC2800 Customer Service Office whose telephone number is (703) 306-3329.



Samuel A. Turner  
Primary Examiner  
Art Unit 2877

SAT  
7/25/03